BRIEFER ARTICLES

A NEW SPECIES OF ACHLYA

(WITH SIX FIGURES)

In October 1906, while studying the Saprolegniaceae of Chapel Hill, we met with a new form of Achlya in a culture taken from a small brook near the east gate of the university campus. *Achlya ferax* and *Saprolegnia diclina* developed in the same collection, but the three species were isolated, and the new form kept growing in pure cultures for over two months. A careful study was made of its growth and structure and some of the observations made are given at the end of this paper. The specific description is as follows:

Achlya hypogyna, sp. nov.—Hyphae slender, tapering gradually toward the apex, at base about 35 μ in diameter, at or near tip about 8 μ, in vigorous cultures reaching a length of 1^{cm}. Zoosporangia nearly cylindrical, sparingly produced. Oogonia generally borne on short branches, racemosely arranged on the main hyphae, but occasionally terminating a main hypha, and very rarely intercalary; globular or rarely oblong, the walls more or less abundantly producing short, rounded outgrowths; yellow when old. Oospores 1–7 (commonly 3–5), centric, diameter 24–36 μ, averaging 27–28 μ. Antheridia cut off from oogonial branches just below the oogonia, very rarely absent. Fertilizing tubes arising from the common septa and penetrating the oogonia from below (hypogynous).

The absence of antheridial branches and the origin of the fertilizing tubes from the septa separating the oogonia and antheridia distinguish this from all other species of Achlya and from all other Saprolegniaceae except the *Hypogyna* group in Saprolegnia. In two or three cases noted a short antheridial branch arose from the main hypha near the oogonium and applied its end to the surface of the oogonium, and in one case such an antheridial branch was of diclinous origin. In all such cases, however, the characteristic sub-oogonial antheridia were also present and no fertilizing tubes were formed from the supernumerary antheridial branches. It is evident that *Achlya hypogyna* is closely related to *A. racemosa* Hildeb., var. *stelligera* Cornu.[1] The general habit, the structure of the oogonia, and the sub-oogonial antheridia are very much the same in both forms;

[1] HUMPHREY, JAMES ELLIS, The Saprolegniaceae of the United States, with notes on other species. Trans. Amer. Philos. Soc. 17:63–148. *pls. 14–20.* 1892.

but the more slender hyphae, the larger oospores, and the exseptate origin of the antheridial branches are characters of sufficient importance to raise the Chapel Hill form to specific rank.

The presence of hypogynous fertilizing tubes in a species so evidently in the same group with *A. racemosa* and its variety *stelligera*, in which they are absent, must modify to some extent our ideas of the distinctive value of this character. MAURIZIO suggests that sub-oogonial antheridia with hypogynous tubes may be of generic value. He says:[2]

Vielleicht könnte man das hypogyne Antheridium zu einem Gattungsmerkmal erhöhen, wodurch die offenbar eine natürliche Gruppe bildenden hypogynen Formen von der Gattung Saprolegnia abgetrennt würden. Charakterisirt eine Querwand in der Traghyphe den in das Oogonium eindringenden Fortsatz als einen Befruchtungsschlauch wie dies bei den zwei vorliegenden Arten der Fall ist . . . . ist dieser ein Analogon des Befruchtungsschlauches bei *Pythium ferax* de Bary, so müsste man auch die letztere Species von den Pythiumarten trennen.

Such a suggestion cannot be considered when we find this character present in only one of a group of such clearly related forms as *A. racemosa*, *A. racemosa stelligera*, and *A. hypogyna*. These three forms, which we might call the *Racemosa* group, are distinctly segregated as MAURIZIO'S *Hypogyna* group among the species of Saprolegnia.[3]

In the cultivation of *Achlya hypogyna* it was found best to use small gnats as a medium. The culture could then be made in hanging drops or on slides in Petri dishes and the growth studied without misplacement. A marked peculiarity was the scarcity of zoosporangia. These were found only in young cultures, appearing about 24 hours after infection; two are shown in *fig. 1*. The oogonia, however, were very abundant; their usual arrangement is shown in *fig. 2*. A mature oogonium and antheridium of typical appearance are represented in *fig. 3*. The fertilizing tube in this case is branched near its base. In a very few cases the oogonia are oblong (*fig. 4*), and some intercalary ones are occasionally seen (*fig. 5*). When the stalk is very short, the antheridium may extend some distance into the main hypha (*fig. 6*). It will be noted that one of the oogonia here shown has no projections on its walls; this peculiarity is of very rare occurrence. In one case a hanging drop containing a gnat was infected with a sporangium in which the spores were formed but not yet discharged. The spores remained in the sporangium, but sent out

[2] Beiträge zur Biologie der Saprolegnieen. Mitteilungen des Deutschen Fischerei-Vereins **7**[1]:1–66. *figs. 19.* 1899.

[3] Flora **79**:109–158. *pls. 3–5.* 1894. Jahrb. Wiss. Bot. **29**:75–131. *pls. I–II.* 1896. Beiträge zur Biologie der Saprolegnieen. Mitteil. Deutsch. Fischerei-Vereins **7**[1]:1–66. *figs. 19.* 1899.

tubes, which penetrated the sporangium wall and ran over to the gnat. In twenty-four hours after the gnat was reached, sporangia were beginning to discharge in the new culture. In another case when infection was made

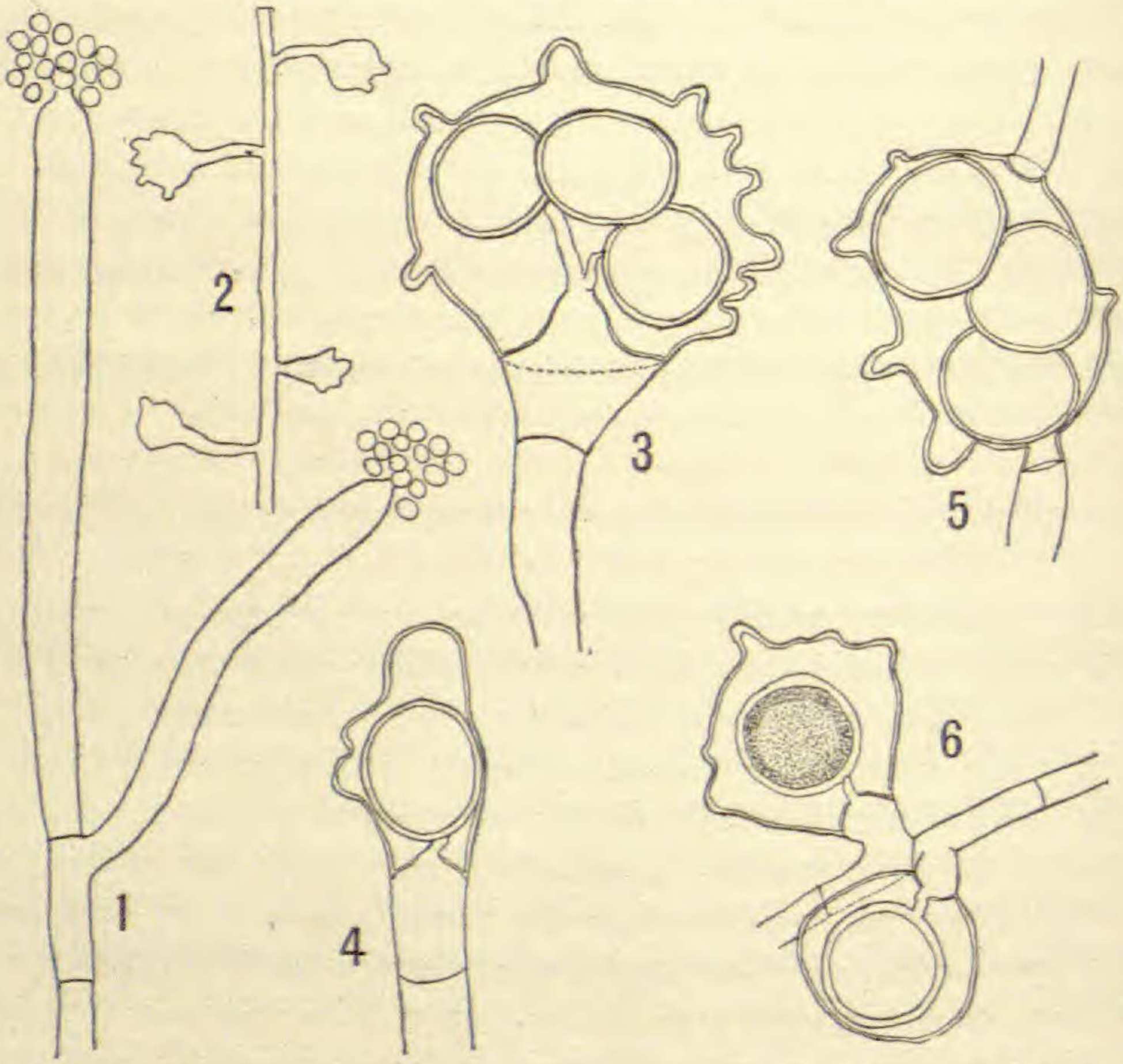

FIG. 1. Two emptied zoosporangia. ×335.—FIG. 2. Immature oogonia on a main hypha. ×75.—FIG. 3. Typical oogonium with three oospores; antheridium below and branched fertilizing tube arising from the partition. ×335.—FIG. 4. Oblong oogonium with antheridium. ×335.—FIG. 5. Intercalary oogonium, without an antheridium. ×335.—FIG. 6. Two short-stalked oogonia, with antheridia extending into main hypha. ×335.

with a hypha bearing some young oogonia, the gnat was penetrated by a hypha which arose from the stalk of one of the oogonia; not until forty-two hours later was the new growth conspicuous.—W. C. COKER and J. D. PEMBERTON, *Chapel Hill, N. C.*

ON THE ORIGIN OF ANGIOSPERMS[1]

In an extensive paper to be published during 1908, I have reached the following conclusions concerning the origin of angiosperms:

[1] After this paper had gone to press, it appeared (in German) in Ber. Deutsch. Bot. Gesells. **25**:496, 497. 1907. The editors were not aware that it had been sent elsewhere for publication, and regret the unnecessary duplication.—EDS.